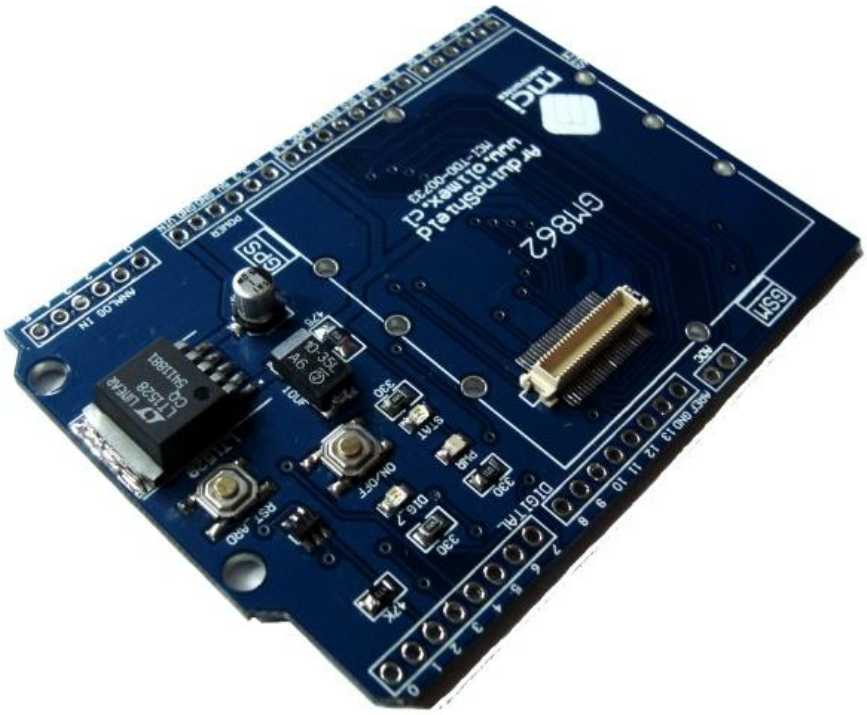
User's Manual

GM862 Arduino Shield

Rev. 1.3

MCI-MA-0063



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Attention: Any changes and modifications done to the device will void its warranty unless expressly authorized by MCI.

Manual Code: MCI – MA - 0063

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INTRODUCTION

The main purpose of this document is to describe the GM862 Arduino Shield functionalities.

This document covers all the functionalities supported by the shield. Basic GM862 modem configuration procedures are also suggested.

The GM862 Arduino Shield enables de Arduino board to make phone calls, send SMS messages, send GPRS data, activate I/O board pins and much more. This merges the great amount of functionalities and flexibility of GM862 modems with the easiness and simplicity of Arduino. These features enables the user to develop projects on the following areas:

- Telemetry and Telecontrol.
- Intelligent security systems.
- Intelligent automatic selling systems.
- Vehicle fleet management systems.

FUNCTIONALITIES

The GM862 Arduino Shield basically provides adequate power for the Telit GM862 modem, and also adapts the pins for working with Arduino.

Some specific features of this device are:

1) 5-9 [VDC] power regulation to 3.8 [VDC]
2) 3 [A] maximum current consumption
3) Power indicator Led
4) GM862 modem status indicator Led
5) User configurable Led
6) GM862 ON/OFF button
7) Arduino reset button
8) GM862 modem ADC port connection
9) Dimensions: 76 x 54 [mm]

DEVICE PARTS

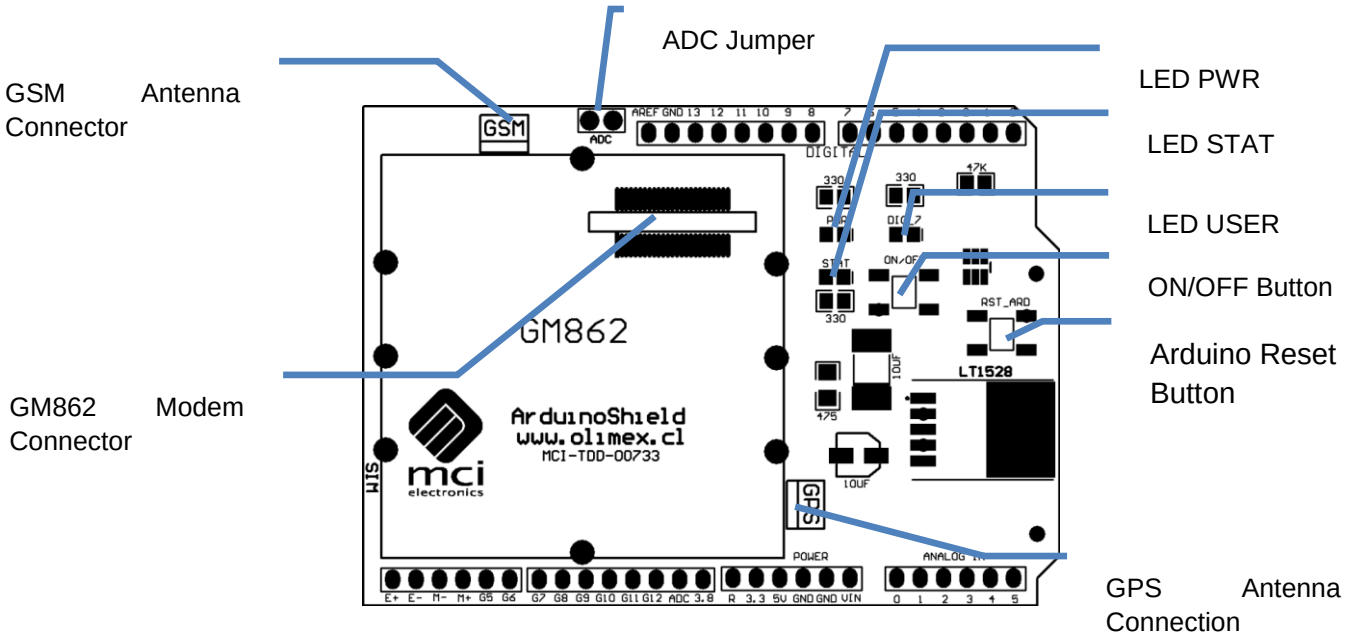

Fig.1 GM862 Arduino Shield board.

- **GM862 Modem Connector**: GM862-GPS modem connector
- **LED STAT**: GM862 modem operation indicator Led
- **LED PWR**: GM862 modem energized indicator Led
- **LED USER**: User configurable indicator
- **GSM Antenna Connector**: External GSM antenna connector
- **GPS Antenna Connector:** External GPS antenna connector
- **ON/OFF Button:** ON/OFF modem button
- **Arduino Reset Button**: Resets the Arduino board
- **ADC Jumper:** Jumper for setting the GM862 modem ADC conversion value to 0 V.

QUICK INSTALLATION AND PROGRAMMING GUIDE FOR THE GM862 ARDUINO SHIELD

Before installing and programming the GM862 Arduino Shield a virtual serial port must be installed, and also, some of the Shield pins have to be connected. This is for communication with both the modem and PC, at the same time. This makes the software debugging procedure more fluid than using the hardware serial port only.

1. Download the example program here.
2. Install the Shield. See fig.2 for reference.
    A. Connect the GM862 modem.
    B. Align the shield in order to connect the shield side pins to the corresponding pins of the Arduino.
    C. Assembly the shield to the Arduino board ensuring ALL of the pins are connected.
3. Insert SIM card into GM862 modem.
4. Connect 5-9 VDC Arduino board power supply.
5. Connect Arduino USB port to the PC.
6. If the FTDI drivers haven't been installed, install them (Download here).
7. Open Arduino Alpha (Download here).
8. Open source code (Example source code introduced in section 5). NewSoftSerial library must be in installed in Arduino\libraries\NewSoftSerial
9. Change the phone number you want to send a SMS.
10. Click *Upload* button in Arduino Alpha.
11. Wait until Stat LED is ON.
    A. The modem behavior can also be seen by clicking the Serial Monitor button, configuring a baud rate of 9600 bps.

At the end of this sequence, a text message was sent to the telephone number indicated in the source code.

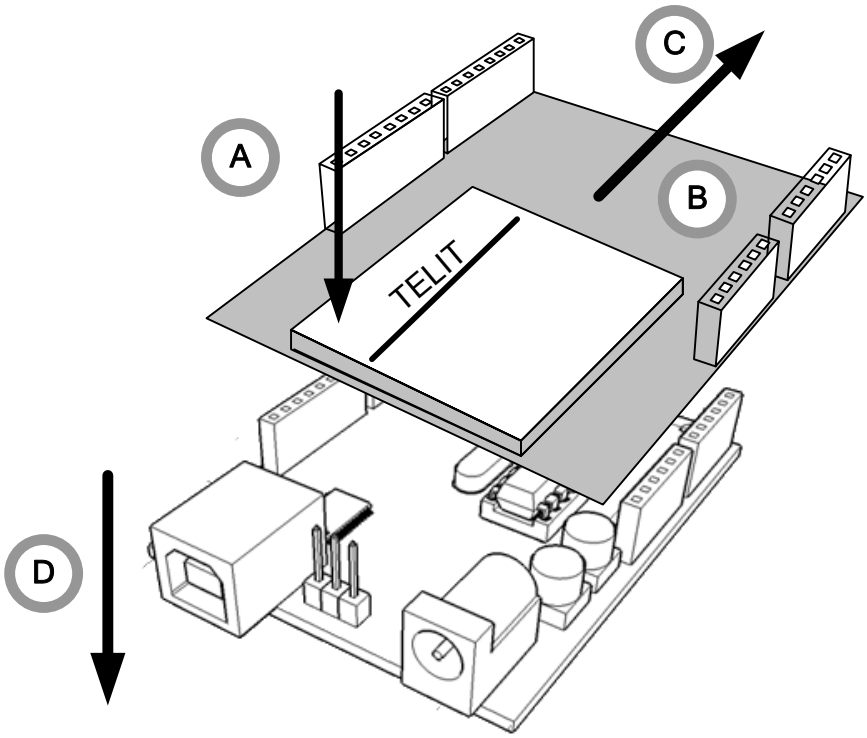

Fig.2 GM862 Arduino Shield board assembly.

GM862_SMS EXAMPLE SOURCE CODE

- The following code was extracted from the library developed by http://tinkerlog.com and modified for working with Arduino Duemilanove board.
- This code sends an SMS to a programmer-defined number, with a pre-defined text. It also does the modem initialization and configuration.
- To upload the example source code, open this file scketch\GM862_SMS\GM862_SMS.pde
- Search function "modem.sendSMS("+569p*hone_number*","*message*")". And replace phone number and message.
- Upload program to Arduino.
- If you open Serial monitor configured to 9600bps, you can see the procedures executed by Arduino.
- The source files can be downloaded from the author website or from www.olimex.cl.

```
/*
File:       GM862_SMS.pde
Author: Moisés Campos
        MCI Electronics
        www.olimex.cl
*/
#include <NewSoftSerial.h>
#include <string.h>
#include "GM862.h"
#define BUF_LENGTH 100
#define txGprs_pin 3
#define rxGprs_pin 2
NewSoftSerial ser(rxGprs_pin,txGprs_pin);
GM862 modem(&ser);

void setup()
{
   Serial.begin(9600);
   modem.switchOn();
   modem.init();
   while (!modem.isRegistered())
      {
          delay(1000);
          modem.checkNetwork();
      }
}

void loop()
{
   modem.sendSMS("+56998300000", "Hello World!");
   digitalWrite(ST_LED_pin,HIGH);
   delay(2000);
   modem.switchOff();
   while(1);
}
```

GM862_LOAD_HTML EXAMPLE SOURCE CODE

- This example configures a HTTP connection with a web server. After connect, the module request a HTML file from server and show it on Serial monitor, configured at 9600 bps.
- To upload the example source code, open this file scketch\GM862_LOAD_HTML\ GM862_LOAD_HTML.pde
- Search function modem.settoInternet("APN", "user….). Replace APN, user name and password for the configuration used by your mobile internet provider
- Upload program to Arduino.
- If you open Serial monitor configured to 9600bps, you can see the procedures executed by Arduino.

```
/*
File:       GM862_SMS.pde
Author: Moisés Campos
        MCI Electronics
        www.olimex.cl
*/
#include <NewSoftSerial.h>
#include <string.h>
#include "GM862.h"
#define BUF_LENGTH 100
#define txGprs_pin 3
#define rxGprs_pin 2

NewSoftSerial ser(rxGprs_pin,txGprs_pin);
GM862 modem(&ser);

char generalBuffer[500];

void setup()
{
   Serial.begin(9600);
   modem.switchOn();
   modem.init();
   while (!modem.isRegistered())
      {
          delay(1000);
          modem.checkNetwork();
      }
   modem.settoInternet("APN","username","password","www.roundsolutions.com", "80");
}

void loop()
{
  modem.connecttoServer();
  byte i = 0;
  Serial.println("Load html...");
  modem.sendd("GET / HTTP/1.0\r\n"); // search twitter for gm862
  modem.sendd("Connection: keep-alive\r\n");     // write on the socket
  modem.sendd("\r\n");
  Serial.println("receiving ...");
  while (i++ < 50) {
    modem.receive(generalBuffer);
```

```
    if (strlen(generalBuffer) > 0) {
      Serial.print("buf:");
      Serial.println(generalBuffer);
      i--;
    }
  }
  Serial.println("done");
   modem.closedConection();
   digitalWrite(ST_LED_pin,HIGH);
   modem.switchOff();
   while(1);
}
```

GM862_GPRS EXAMPLE SOURCE CODE

- This example opens a TCP/IP socket, reads an analog input and sends data to configured server in realtime.
- To upload the example source code, open this file scketch\GM862_GPRS\ GM862_GPRS.pde
- Search function modem.settoInternet("APN", "user….). Replace APN, user name and password for the configuration used by your mobile internet provider
- Upload program to Arduino.
- If you open Serial monitor configured to 9600bps, you can see the procedures executed by Arduino.

```
/*
File:       GM862_SMS.pde
Author: Moisés Campos
        MCI Electronics
        www.olimex.cl
*/ #include <NewSoftSerial.h>
#include <string.h>
#include "GM862.h"
#define BUF_LENGTH 100
#define txGprs_pin 3
#define rxGprs_pin 2

NewSoftSerial ser(rxGprs_pin,txGprs_pin);
GM862 modem(&ser);

char generalBuffer[100];

void setup()
{
   Serial.begin(9600);
   modem.switchOn();
   modem.init();
   while (!modem.isRegistered())
      {
          delay(1000);
          modem.checkNetwork();
      }
   modem.settoInternet("APN", "username", "password", "domain", "port");
}

void loop()
{
  modem.connecttoServer();
  char iteracion =0;
  while(iteracion < 4)
   {
     char tmp;
     Serial.println("");
     float temperature = float(analogRead(0));
     temperature = processinSensor(temperature,-21.244,1.7908,-0.0278,0.0003,0,(100.0/1024));
     strcpy(generalBuffer,"Temperatura Actual = ");
     char *pTemporal = generalBuffer + strlen(generalBuffer);
     ftoa(pTemporal,temperature,1);
```

```
        modem.transmittoServer(generalBuffer);
        delay(5000);
        iteracion++;
        Serial.println(generalBuffer);
      }
      modem.closedConection();
      digitalWrite(ST_LED_pin,HIGH);
      delay(2000);
      modem.switchOff();
      while(1);
    }

    float processinSensor(float sensor, float a, float ax,float axx, float axxx,float axxxx,
float factor) {
        sensor=(sensor*factor);//valor normalizado, y luego transformado en %
        sensor= (axxxx*pow(sensor,4)+axxx*pow(sensor,3)+axx*pow(sensor,2)+ax*sensor+a);
    return sensor;}

    void *ftoa(char *a, double f, int precision){
      float p[] = {0.0,10.0,100.0,1000.0,10000.0,100000.0,1000000.0,10000000.0,100000000.0};
      char *ret = a;
      char mantiza[10];
      long heiltal = long(f);
      ltoa(heiltal, a, 10);
      while (*a != '\0') a++;
      *a++ = '.';
      long decimal = abs(long((f - float(heiltal)) * p[precision]));
      ltoa(decimal, mantiza, 10);
      for(;strlen(mantiza) < precision; precision--)
        *a++ = '0';
      strcpy(a , mantiza);}
```

PORT MAPPING

GM862 Arduino Shield port mapping

Pin	Name/Function
DIGITAL 0	Serial RX
DIGITAL 1	Serial TX
DIGITAL 2	SoftSerial RX
DIGITAL 3	SoftSerial TX
DIGITAL 4	ON/OFF Modem
RESET	RESET Ard
EAR_HF+	Handset ear output, phase +
EAR_HF-	Handset ear output, phase -
MIC_HF-	Handsfree microphone input; phase -, nominal level 3mVrms
MIC_HF+	Handsfree microphone input; phase +, nominal level 3mVrms
GPIO5	Configurable general purpose I/O pin
GPIO6	GP I/O pin or ALARM output pin
GPIO7	GP I/O pin or Buzzer output pin
GPIO8	Configurable general purpose I/O pin
GPIO9	Configurable general purpose I/O pin
GPIO10	Configurable general purpose I/O pin
GPIO11	Configurable general purpose I/O pin
GPIO12	Configurable general purpose I/O pin
ADC	ADC input
3.8V	3.8V regulated voltage

DOCUMENT HISTORY

Revision	Date	Edited by	Description/Changes
1.0	August 12, 2010	E. Martin	Initial document version
1.1	September 22, 2010	E. Martin	Software Serial Port usage example code is included.
1.2	November 23, 2010	E. Martin	New board version update.
1.3	July 21, 2011	M. Campos	Includes new examples and library improvements.